

## CUSHIONING DEVICE FOR FURNITURE

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### RELATED APPLICATION

This application is a divisional of United States Patent Application Serial Number 10/268,034 filed on October 9, 2002, the disclosure of which is hereby incorporated herein by reference in its entirety as if set forth fully herein.

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### FIELD OF THE INVENTION

The present invention relates generally to furniture and, more particularly, to devices for protecting furniture from damage during normal use, shipping and handling.

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### BACKGROUND OF THE INVENTION

Various types of furniture such as cabinets, dressers, and the like, have movable components such as doors or drawers that open and close against a frame. The opening and closing of such furniture components may cause damage to the frame under normal usage. In addition, during shipping or handling, furniture parts may swing open with more force than is typical under normal usage and cause additional wear and tear on the furniture piece. This tendency may be particularly problematic for heavy doors, furniture with sharp edges, or furniture made from less durable materials prone to damage.

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Devices have been developed for temporarily restraining furniture doors from lateral movement during shipping and handling. For example, U.S. Patent No. 3,997,205 describes a cabinet door clip formed with a pair of U-shaped bends that are configured to limit lateral movement of a cabinet door. Co-assigned and co-pending U.S. Publication No. 2002-0089269 filed January 10, 2001 describes a cabinet door clip configured for restraining furniture doors from both vertical and horizontal movement relative to a frame during shipping and handling. The disclosures of both U.S. Patent No. 3,997,205 and U.S. Publication No. 2002-0089269 are hereby incorporated herein by reference in their entireties. However, even when a door, drawer, or other movable furniture component is restrained

during shipping, damage can occur. For example, many furniture clips allow some motion, which may be significant enough to cause damage to furniture surfaces.

Damage from movable furniture components can also occur during normal usage. Various cushioning devices have been made to protect furniture at the interface between a frame and a movable part. Such devices can typically require a hard plastic portion to hold the device in place and a softer plastic portion to provide a cushion. Devices made from two types of plastic materials of differing rigidity may be expensive and cumbersome to make. Alternatively, adhesive may be used to affix a soft plastic or rubber cushion to the point of contact to protect furniture parts. However, adhesives can leave undesirable glue residue on the furniture piece and harm furniture finishes.

#### SUMMARY OF THE INVENTION

In view of the above discussion, cushioning devices for protecting movable furniture components and frames are provided. In certain embodiments, a device for protecting first and second confronting furniture components includes a base member having opposite first and second faces. The first face is adapted to contact the first furniture component, and the base member has a cushioning projection that extends outwardly from the second face of the base member and covers a void within the base member. The projection is adapted to contact the second furniture component as it confronts the first furniture component.

In some embodiments, a device for securing and protecting confronting movable and frame members of a furniture piece includes a base member having opposite first and second faces. The first face is adapted to contact the frame member, and the base member has a cushioning projection extending outwardly from the second face of the base member and covering a void within the base member. The projection is adapted to contact the movable member as it confronts the frame member of the furniture piece. A securing member extends outwardly from the base member second side and is configured to removably secure the movable member against the cushioning projection.

In other embodiments, a device for protecting opposing furniture components includes first and second base members extending away from a common vertex. The first and second base members each have first and second

opposing faces. The first face is adapted to contact the first furniture component. The first and second base members each have a cushioning projection extending outwardly from the second faces of the first and second base members. Each projection is adapted to contact the second furniture component as it confronts the first furniture component.

In further embodiments, an article of furniture is provided that includes a frame, a movable member connected with the frame and movable from an open position to a closed position, and a device for protecting the movable member in a closed position relative to the frame. The device includes a base member having opposite first and second faces. The first face is adapted to contact the frame. The base member has a cushioning projection extending outwardly from the second face of the base member and covering a void within the base member. The projection is adapted to contact the movable member as it confronts the frame.

In still further embodiments a method for manufacturing a device for protecting first and second confronting furniture components includes providing a mold including a pair of mating mold halves that form a cavity. The cavity is configured to form a base member having opposite first and second faces. The first face is adapted to contact the first furniture component and the second face has a cushioning projection extending away from the second face. Molten polymeric material is injected into the cavity. A gas is injected into the cavity at a pressure sufficient to cause a void to form within the base member so that the cushioning projection covers the void. The polymeric material is cooled to a solid state such that it forms a cushioning device.

## BRIEF DESCRIPTION OF THE DRAWINGS

**Figure 1** is a side view of a cushioning device according to embodiments of the present invention.

**Figure 2** is a perspective view of a restraining clip for restraining furniture doors from opening during shipping and handling having a cushion according to embodiments of the present invention.

**Figure 3** illustrates the clip of **Figure 2** installed on a door and frame.

**Figure 4** is a perspective view of a cushioning restraining clip for restraining furniture doors during shipping and handling, according to embodiments of the present invention.

**Figure 5** is a side elevation view of the clip of **Figure 4** illustrating the clip in an uninstalled condition.

**Figure 6** illustrates the clip of **Figure 4** with a portion of a door frame removably secured between two panels.

**Figure 7** illustrates a pair of clips according to the embodiment of **Figure 4** wherein one clip is secured to a top portion of a door and to an adjacent door frame portion, another clip is secured to a bottom portion of the door and to an adjacent door frame portion, and both clips restrain the door from both vertical and horizontal movement relative to the frame.

**Figure 8** is a perspective view of a cushioning device for protecting a frame from movement from a movable furniture component such as a drawer or door according to embodiments of the invention.

**Figure 9** is a front view of the cushioning device of **Figure 8**.

**Figure 10** is a side view of the cushioning device of **Figure 8**.

**Figure 11** illustrates a pair of cushioning devices according to the embodiments of **Figure 8** installed in the frame of a cabinet.

#### DETAILED DESCRIPTION OF THE INVENTION

The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. In the drawings, like numbers refer to like elements throughout. Thicknesses and dimensions of some components may be exaggerated for clarity.

The present invention relates to cushioning devices that can be used to protect movable furniture parts during shipping and handling and/or during normal usage. Cushioning devices according to certain embodiments of the invention may be manufactured economically from a single piece of material using various

inexpensive materials and known manufacturing techniques including injection molding and gas assist molding. Gas assist molding involves the injection of a gas into a cavity that has been partially filled with resin. The gas injection can be used to create a void in the molded component.

5 For ease of discussion, the embodiments described herein are shown with reference to a door and frame. However, cushioning devices according to embodiments of the invention may be used in connection with any movable furniture component, including cabinet drawers, doors, and corresponding frame components.

10 A cushion **100** according to embodiments of the present invention is illustrated in **Figure 1**. The cushion **100** includes a base **112** with two opposing faces **111** and **113** and a convex cushioning projection **114** on one face **113**. As illustrated by the phantom lines in **Figure 1**, the projection **114** is compressible. The projection **114** covers a void **122** within the base **112**. The base **112** includes a  
15 planar portion **120** opposite the cushioning projection **114** that has a thickness that is less than the thickness of the base **112**.

The cushion **100** can be used to protect confronting furniture components. The face **111** can be configured to contact a furniture component such as a frame that confronts a movable component such as a door or drawer. The projection **114**  
20 may contact the movable furniture component as it confronts the opposing furniture component such that the furniture components are protected from damage.

The projection **114** can have varying degrees of compressibility. In certain embodiments of the present invention, a rigid projection is provided that is not  
25 compressible and can cushion furniture components by providing a curved surface.

In certain embodiments, and as noted above, the convex projection **114** and/or the planar portion **120** opposite the projection **114** can have a thickness that is less than the thickness of the base **112**. Depending on the materials used and the dimensions desired, it may be possible to manufacture a cushion **100** inexpensively  
30 as a unitary member (i.e., from a single piece of material) such that the cushioning projection **114** is thinner and more resilient than the base **112**. Such devices may be easier and less expensive to manufacture than multi-component prior art cushions made from a rigid material to hold the device in place and a softer

material to cushion the furniture components. For example, in certain embodiments described herein, the base 112 may be modified to provide a hooking or clipping mechanism for attachment to a furniture component. Such mechanisms for attachment may require that the base 112 be relatively rigid. However, a more resilient, compressible projection 114 may be desirable to cushion and project furniture components.

**Figure 2** illustrates a restraining clip 10 for restraining furniture doors and/or drawers from lateral movement during shipping and handling. The clip 10 includes a compressible cushion 126 that covers a void 124. The cushion 126 is elongated, and the void 124 extends through the cushion 126 and forms an opening at both ends. However, various shaped cushions may be used having one or more openings. In some embodiments, a cushion is provided that completely covers the void such that there are no openings. Examples of cushion shapes include three-dimensional shapes such as hemispheres, hemi-ellipsoids, polyhedrons, semi-cylinders, half-cones, and the like.

Referring to **Figures 2 and 3**, the clip 10 is configured to engage an edge portion of a door 13 and a frame member 15 and to restrain the door 13 from opening. The illustrated clip 10 includes a vertical segment 11, a portion 12 located at one end of the vertical segment 11 that is configured to engage a portion of the door 13, and a portion 14 located at the other end of the vertical segment 11 that is configured to engage a portion of the frame 15 when the door 13 is closed. The door 13 contacts the cushion 126 and can be protected from damage thereby.

Referring now to **Figures 4 and 5**, a clip 30 for restraining furniture doors from both vertical and horizontal movement during shipping and handling according to embodiments of the present invention is illustrated. The clip 30 has a cushion 150 and a void 152. The clip 30 includes an elongated base member 32 having opposite sides 32a, 32b. A pair of elongated panels 34, 36 extend outwardly from the base member on side 32a in spaced-apart, opposing relationship, as illustrated. The panel 34 includes opposite sides 34a, 34b, and a free end 34c. The panel 36 includes opposite sides 36a, 36b, and a free end 36c. The panel free end 34c includes a hook 37 that is configured to removably secure the frame of an article of furniture (such as a cabinet or frame) against the base

member on side **32a**.

The illustrated hook **37** includes an end **37a** that is secured to panel **34**, and an opposite free end **37b** that extends from the panel first side **34a** in a direction toward the base member side **32a**. A reinforcing fillet **33** is provided between the hook **37** and the first panel first side **34a** to provide additional rigidity to the hook **37** and to help prevent the hook **37** from breaking off from the panel **34** when subjected to the loads experienced during the securing of a door. In the illustrated embodiment, the hook free end **37b** extends from the panel side **34a** at an angle **a** (**Figure 5**) of between about 40 degrees and about 60 degrees.

As shown in **Figure 6**, the panel **34** extends outwardly from the base panel side **32a** in a direction **L<sub>1</sub>** that converges with the outwardly extending direction **L<sub>2</sub>** of the second panel **36** when in an uninstalled condition. When a portion of a frame **52** is inserted between the panels **34** and **36**, the panel **34** bends away from the panel **36** to allow the frame **52** to be inserted between the panels **34** and **36**. As illustrated in the phantom line in **Figure 6**, the panel **34** tries to return to its uninstalled (*i.e.*, relaxed) condition, thereby causing the hook **37** to impart biasing forces **F<sub>1</sub>** and **F<sub>2</sub>** against the frame **52**, which push the frame **52** against the base member side **32a** and panel **36**.

The panel side **36a** has a tapered portion **35** adjacent the panel free end **36c**. The tapered portion **35** is designed to facilitate insertion of a frame between the panels **34** and **36**. In the illustrated embodiment, a reinforcing member **40**, in the form of a gusset, extends from the panel second side **36b** to the base panel side **32a**. The reinforcing member **40** is configured to provide additional strength and reduce deflection of the panel **36** caused by movement of a frame in a direction toward the panel **36**. The reinforcing member **40** may have various configurations and shapes and is not limited to the illustrated embodiment.

An elongated panel **38** extends outwardly from the base member side **32b**, as illustrated. The panel **38** includes opposite sides **38a**, **38b** and a free end **38c**. The panel side **38a** is configured to engage an end portion of door **53** (or the movable furniture component **53**, such as a drawer) such that vertical movement of the door **53** relative to the frame is restrained. A cushion **150** contacts the door **53** and protects the door **53** from the frame **52**. In the illustrated embodiment, the

panel side **38a** includes a raised portion **39** adjacent the panel free end **38c**. The raised portion **39** is configured to removably secure a door against the base member side **32b**.

In the illustrated embodiment, a reinforcing member **42**, in the form of a gusset, extends from the panel side **38b** to the base panel side **32b**. The reinforcing member **42** is configured to strengthen the panel **38** and reduce deflection of panel **38** caused by movement of the door **53** in a direction toward panel **38**. The reinforcing member **42** may have various configurations and shapes and is not limited to the illustrated embodiment.

Referring now to **Figure 7**, two clips **30** according to embodiments of the present invention are illustrated in an installed configuration on an article of furniture, such as a cabinet. One clip **30** is secured to an upper end portion **50a** of a vertically hung furniture door **50** and to an adjacent upper frame portion **52a** as illustrated. A second clip **30** is secured to a lower end portion **50b** of the vertically hung furniture door **50** and to an adjacent lower frame portion **52b** as illustrated. The respective clips **30** restrain the vertically hung door **50** in both vertical and horizontal directions indicated by arrows **V** and **H**. Cushions **150** and voids **152** contact the door **50** and may protect the door **50** and frame portions **52a** and **52b** from damage. Other types of opposing furniture components can be secured and protected by clips **30**, including drawers and other components with one or more movable parts.

**Figures 8-11** illustrate a protecting device **180** for protecting opposing furniture components (**Figure 11** illustrates the device **180** in an installed configuration on an article of furniture, such as a cabinet). In as much as the illustrated device **180** does not include a mechanism for restraining a door, for example, during shipping and handling, the device **180** may be suitable for protecting opposing furniture components during normal usage or other applications where the restraint of movable components is not necessary.

Referring to **Figures 8-10**, the device **180** includes two base members **160** and **162** that extend generally perpendicularly away from a common vertex. The device **180** includes a securing portion **172** for securing the device **180** to a furniture component such as a frame on a cabinet. The base members **160** and **162**



have cushions **164** and **166** on a surface configured to contact a movable furniture component such as a drawer or door. Cushions **164** and **166** cover voids **168** and **170**. Cushions **164** and **166** are elongated, and voids **168** and **170** extend lengthwise through cushions **164** and **166** to form an opening at either end of the cushions **164** and **166**. Various shaped cushions with closed or open ends may be used.

**Figure 11** illustrates the device **180** installed in the frame **184** of a door **182**. A similar configuration may be used in a frame and drawer assembly or other furniture pieces having opposing components. The cushions **164** and **166** contact the door **182** when the door **182** is in the closed position and can protect the door **182** and/or the frame **184** from damage during use.

The device **180**, cushions **100** (**Figure 1**), and clips **30** (**Figures 2-7**) according to embodiments of the present invention can be manufactured from various materials using various processes understood by those of skill in the art. Exemplary materials include, but are not limited to, polymeric materials such as polyethylene and polypropylene, and exemplary manufacturing methods include, but are not limited to, injection molding, in particular gas assist molding (*see* U.S. Patent Nos. 4,935,191 and 5,112,53, which are hereby incorporated herein by reference in their entireties, for a general description of gas assist molding).

In certain embodiments, the cushion can have a thickness between about .020 and .090 inches or preferably, between about .040 and about .070 inches. The base member can have a thickness between about .090 and .150 inches.

In gas assist molding, a mold including a pair of mating mold halves that form a cavity is provided. The cavity can be configured to form variously shaped devices according to embodiments of the invention. Molten polymeric material is injected into the cavity. A gas is injected into the cavity at a pressure sufficient to cause a void to form within the base member so that the cushioning projection covers the void. The polymeric material is cooled to a solid state such that it forms a cushioning device. Preferred gases for forming the void using a gas assist molding process include nitrogen. Preferred injection pressure for gasses forming the void are between about 400 psi and about 8,000 psi.

The foregoing is illustrative of the present invention and is not to be construed as limiting thereof. Although a few exemplary embodiments of this

invention have been described, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of this

5 invention as defined in the claims. Therefore, it is to be understood that the foregoing is illustrative of the present invention and is not to be construed as limited to the specific embodiments disclosed, and that modifications to the disclosed embodiments, as well as other embodiments, are intended to be included within the scope of the appended claims. The invention is defined by the following

10 claims, with equivalents of the claims to be included therein.